Section 9-8: Perfect Squares and Difference of Squares

By the end of this lesson, you should be able to answer:

- How do you factor perfect square trinomials?
- How do you factor the difference of perfect squares?

Where you might see this in the real world:

- Travel, number sense, modeling, geography

Define the following term:

1. Perfect square trinomial

2. Difference of two squares

When we multiplied two binomials together, we got a trinomial. There are two special cases that we are going to look at and figure out how to factor them. First, let's examine the perfect square trinomial.

This trinomial will be known as a perfect square since the two factors are going to be the same. 25 is a perfect square since 5 X 5 = 25. The same goes with the perfect square trinomial. It will factor into a binomial square.

Let's look at how it is developed:

$(a - b)^2$

Notice that the first term is a perfect square:

The last term is also a perfect square:

The middle term is twice the product of the first and last terms:

This pattern will always hold for any perfect square trinomial. We can use this to factor any perfect square trinomial.

Example 1: Factor.

a. $9x^2 + 12x + 4$

b. $y^2 - 20y + 100$

c. $x^2 - 14x + 49$

d. $x^2 + 7x + 14$

The difference of squares also arises from a special case. When we multiply two binomials together that have the same terms, but the sign between the terms is different, we will end up with a difference of squares.

$(a - b)(a + b)$

When we have a binomial that where the first and last terms are perfect squares and the sign in between is a minus sign, we can factor back into two binomials where the signs inside are different. The first term in each binomial is the square root of the first term. The last term in each binomial will also be the square root of the last term.

Example 2: Factor.

a. $64x^2 - 81$

b. $r^2 - 121$

c. $t^2 - 900$

d. $y^2 + 100$

e. $25x^4y^4 - 36z^8$

f. $16h^2 - 144$

Problem Set:

"There are two kinds of men who never amount to much: those who cannot do what they are told and those who can do nothing else." - Cyrus H. Curtis